Ontario

Apprenticeship
In-school Curriculum Standard

Pool & Spa/Hot Tub Installer

Level 2 - Advanced

237T

Ministry of Training, Colleges and Universities

Apprenticeship
In-school Curriculum Standard

Pool & Spa/Hot Tub Installer

Level 2 - Advanced

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Introduction

This curriculum standard for the Pool and Spa/Hot Installer trade, Level 2 – Advanced is based upon the on-the-job performance objectives, located in the industry-approved training standard.

The curriculum is organized into 8 reportable subjects. The Program Summary of Reportable Subjects chart summarizes the training hours for each reportable subject. The curriculum identifies only the learning that takes place off-the-job.

The in-school program focuses primarily on the theoretical knowledge and the essential skills required to support the performance objectives of the Apprenticeship Training Standards. Employers/Sponsors are expected to extend the apprentice's knowledge and skills through practical training on the work site.

Regular evaluations of the apprentice's knowledge and skills are conducted throughout training to ensure that all apprentices have achieved the learning outcomes identified in the curriculum standard.

It is not the intent of the in-school curriculum to perfect on-the-job skills. The practical portion of the in-school program is used to reinforce theoretical knowledge. Skill training is provided on the job.

Program Summary of Reportable Subjects – 237T - Level 2 – Advanced

Number	Reportable Subjects	Hours Theory	Hours Practical	Hours Total
S1125	Applied Trade Safety Practices	6	0	6
S1126	General Installation Practices	30	6	36
S1127	Basic Principles of Project Management	18	6	24
S1128	Customer Service & Communications	9	3	12
S1129	Automation and Controls	24	6	30
S1130	Advanced Plumbing Installations	21	3	24
S1131	Decking and Deck Components	24	3	27
S1132	Specialty Applications and Construction	42	9	51
	Total	174	36	210

Number: **S1125.0**

Reportable Subject: **APPLIED TRADE SAFETY PRACTICES**

Duration: Total 6 hours Theory 6 hours Practical 0 hours

Prerequisites: Grade 12

Content:

S1125.1 Identify safety regulations that are applicable to Pool & Spa / Hot Tub construction and installations. **0.5/0 hrs**

S1125.2 Identify safety procedures and practices as required on the worksite, operating vehicles, and at the shop. **1/0 hrs**

S1125.3 Identify safety procedures when handling and mixing chemicals, paints, and solvents. **2/0 hrs**

S1125.4 Identify required protective clothing and gear. **0.5/0 hrs**

S1125.5 Identify emergency fire procedures. **1/0 hrs**

S1125.6 Identify basic first aid and reporting procedures. **1/0 hrs**

Evaluation & Testing:

Assignments related to theory and appropriate application skills
Minimum of one mid-term test during the term
Final exam at end of term
Periodic quizzes

Mark Distribution:

Theory Testing	Practical Application Testing	Module Final Assessment
100%	0%	100%

Instructional and Delivery Strategies:
Lecture
Classroom workshops
Video
Computer Based Training
E-Learning

Reference Materials:
Occupational Health and Safety Act - WHMIS Handbook
Transportation of Dangerous Goods
TSSA
ESA

S1125.0 Applied Trade Safety Practices

Duration: Total 6 hours Theory 6 hours Practical 0 hours

Cross Reference to Installer Training Standards:
1.01-1.10, 2.07, 3.03-3.14, 3.16, 4.03-4.12, 5.03-5.17, 5.19, 6.03-6.09

GENERAL LEARNING OUTCOMES

Upon successful completion, the apprentice is able to identify practices to maintain a safe construction and installation work site and for self and others that complies with current government regulations.

LEARNING OUTCOMES AND CONTENT

S1125.1.0 Identify safety regulations that are applicable to Pool & Spa/Hot Tub construction and Installation. (0.5/0 hrs)

Identify pertinent safety legislation including:
- Occupational Health and Safety Act
- Workplace Hazardous Materials Information System
- Transportation of Dangerous Good Regulations
- Workers Safety and Insurance Board
- First Aid regulations

S1125.2 Identify safety procedures and practices as required on the worksite, operating vehicles, and at the shop. (1/0 hrs)

Identify safe working procedures including:
- lifting techniques
- working conditions
- handling of tools and equipment
- excavations
- barricades and guards
- fall rest protection
- fire protection
- ventilation
- safety barriers
- good housekeeping

LEARNING CONTENT:

S1125.3 Identify safety procedures when handling and mixing chemicals, paints, and solvents. (2/0 hrs)

Describe safety procedures for handling and mixing including:

- chemical spill handling
- ventilation requirements

S1125.4 Identify required protective clothing and gear. (0.5/0 hrs)

S1125.5 Identify fire emergency procedures. (1/0 hrs)

S1125.6 Identify basic first aid and reporting procedures. (1/0 hrs)

Number:	**S1126.0**	
Reportable Subject:	**GENERAL INSTALLATION PRACTICES**	
Duration:	Total 36 hours Theory 30 hours Practical 6 hours	
Prerequisites:	Grade 12	
Content:	S1126.1	Demonstrate procedures for completing site evaluations. **5/1 hrs**
	S1126.2	Describe use of specialty trade tools and equipment. **5/1 hrs**
	S1126.3	Identify methods for completing measurements of types of pool and spa/hot tubs. **5/1 hrs**
	S1126.4	Describe different types and construction techniques for concrete pool and spa/hot tubs. **5/1 hrs**
	S1126.5	Describe methods of finishing concrete pool interiors. **5/1 hrs**
	S1126.6	Describe dismantling and restoration techniques. **5/1 hrs**
Evaluation & Testing:	Assignments related to theory and appropriate application skills Minimum of one mid-term test during the term Final exam at end of term Periodic quizzes	

Mark Distribution:

Theory Testing	Practical Application Testing	Module Final Assessment
85%	15%	100%

Instructional and Delivery Strategies:
Lecture
Classroom workshops
Video
Computer Based Training
E-Learning

Reference Materials:
Manufacturers' Technical Manuals
Ministry of Transportation Legislation
ASPI Basic Pool & Spa/Hot Tub Technology 3rd Edition
ASPI Builders Reference Manual

S1126.0 General Installation Practices

Duration: Total 36 hours Theory 30 hours Practical 6 hours

Cross Reference to Installer Training Standards:
2.01-2.10; 3.01-3.10; 4.01- 4.08; 5.01-5.10; 6.01-6.11; 7.01-7.09; 8.01-8.09

GENERAL LEARNING OUTCOME:

Upon successful completion, the apprentice is able to identify and describe common practices for the installation of pools and spa/hot tubs.

CURRICULUM OUTCOMES:

S1126.1 Demonstrate procedures for completing site evaluations. (5/1 hrs)

Describe procedures for developing a detailed site evaluation including:

- notes
- observations
- measurements
- equipment location and identification
- switches
- pumping equipment
- filter
- emergency shut-offs
- feeders
- storage facilities
- chemicals
- utilities locations
- public facilities
- dangerous or unsafe conditions
- non-conformance of equipment installation or location

Demonstrate the completion of detailed site plans and sketches including:

- scale drawings
- detailed notes
- checklist

LEARNING CONTENT:

S1126.1 (cont'd)

Describe site surveying techniques including:

- triangulation measurement
- dumpy levels
- laser levels
- surveying rod measurements

S1126.2 Describe use of specialty trade tools and equipment. (5/1 hrs)

Describe the safe operation of applicable specialty trade tools including:

- hand tools
  - liner pullers
  - PVC pipe cutter
  - hydrotherapy jet tools
- electrical tools
  - heat guns
  - liner setting vacuums
  - pipe blowers

Describe operations and functions of fuel-powered tools and equipment including:

- gas pumps
- pressure washers
- cut off saws
- compressors

Describe maintenance procedures for specialty tools including:

- care and upkeep
- routine maintenance
- application
- manufacturer's specifications

Develop checklists for tool repair and maintenance including:

- logbooks
- warranty registrations
- record keeping

LEARNING CONTENT:

S1126.3 Identify methods for completing measurements of types pool or spa/hot tubs. (5/1 hrs)

Identify types of covers for pool or spa/hot tubs including:

- pool safety
- automatic
- fitted
- overlapped
- solar
- spa/hot tub thermal covers
- insulating safety
- roll-up

Demonstrate procedures for calculating dimensions using:

- triangulation
- scale drawings
- linear measurement
- depth measurement
- interior profiling
- perimeter measurements

S1126.4 Describe different types and construction techniques for concrete pool and spa/hot tubs. (5/1 hrs)

Identify and describe construction techniques for concrete pool and spa/hot tubs including:

- excavation
- stone and drain work
- groundwater control
- form work
- reinforcing steel
- electrical bonding
- rough-in of plumbing and fixtures
- concrete placement
- surface finishing
  - tile
  - coping
- backfilling

LEARNING CONTENT:

S1126.5 Describe methods of finishing concrete pool interiors. (5/1 hrs)

Describe types of concrete pool interior finishes including:

- tile
- paint
- plaster
- marsite

Describe surface preparation techniques including:

- acid washing
- acid etching
- surface grinding

Describe interior application and installation techniques including:

- brushing
- rolling
- spraying
- grouting
- mortaring
- gluing

Describe various types of adhesives including:

- construction adhesives
- tile set
- grout
- additives
- mortar

LEARNING CONTENT:

S1126.6 Describe dismantling and restoration techniques. (5/1 hrs)

Describe routine housekeeping and preparation techniques including:

- general upkeep
- routine clean-up procedures
- manufacturers' specifications
- warranty documentation
- log books
- permits

Identify techniques for dismantling and restoring worksite elements including:

- landscaping
- sod restoration
- fences
- decks
- interlocking stone

Number: **S1127.0**

Reportable Subject: **BASIC PRINCIPLES OF PROJECT MANAGEMENT**

Duration: Total 24 hours Theory 18 hours Practical 6 hours

Prerequisites: Grade 12

Content:

S1127.1 Describe basic business terminology. **2/0 hrs**

S1127.2 Describe basic business management principles. **2/0 hrs**

S1127.3 Describe basic installation job-costing and reporting procedures. **2/0 hrs**

S1127.4 Describe basic principles of time management. **2/0 hrs**

S1127.5 Describe basic principles of risk management. **2/0 hrs**

S1127.6 Describe procedures for estimating an installation. **4/3 hrs**

S1127.7 Describe procedures for writing up and reporting an installation. **4/3 hrs**

Evaluation & Testing:

Assignments related to theory and appropriate application skills
Minimum of one mid-term test during the term
Final exam at end of term
Periodic quizzes

Mark Distribution:

Theory Testing	Practical Application Testing	Module Final Assessment
75%	15%	100%

Instructional and Delivery Strategies:
Lecture
Classroom workshops
Video
Computer Based Training
E-Learning

Reference Materials:
Manufacturers' Technical Manuals
ASPI Basic Pool & Spa/Hot Tub Technology 3rd Edition
Aquatic Facility Operator 3rd Edition
Project Management for Builders and Contractors

S1127.0 BASIC PRINCIPLES OF PROJECT MANAGEMENT

Duration: Total 24 hours Theory 18 hours Practical 6 hours

Cross Reference to Installer Training Standards:
2.01, 2.02, 2.04-2.09, 2.11; 3.01-3.09, 3.11; 4.01-4.07, 4.09; 5.01-5.09, 5.11; 6.01-6.10, 6.13; 7.01-7.08, 7.10; 8.01-8.08, 8.10

GENERAL LEARNING OUTCOME:

Upon successful completion, the apprentice is able to describe basic principles of project management for installers working in the pool and spa/hot tub industry.

CURRICULUM OUTCOMES:

S1127.1 Describe basic business terminology. (2/0 hrs)

Identify basic business practices terminology including:

- accounting
  - receivable
  - payables
  - collection
  - reporting
- industry
  - suppliers
  - distribution
  - manufacturing
- sales
  - marketing
  - promotion

S1127.2 Describe basic business management principles. (2/0 hrs)

Identify internal company organization and reporting structures including:

- administration
- managers
- supervisors
- sub-contractors

LEARNING CONTENT:

S1127.3 Describe basic installation job-costing and reporting procedures. (2/0 hrs)

Describe elements of job-costing and reporting procedures including:

- installation information and times
- parts
- labour costs
- follow-ups
- time
- material usage
- budget analysis
- equipment expense
- deficiency reports
- inspection sheets
- job completion report
- tools
- cost of permits
- cost of sub-trades
- replacement parts

S1127.4 Describe basic principles of time management. (2/0 hrs)

Describe basic time management principles including:

- installation scheduling
- time frames
- task prioritization
- route planning
- data management
- labour recording

LEARNING CONTENT:

S1127.5 Describe basic principles of risk management. (2/0 hrs)

Describe basic risk management principles including:

- property protection
- safety policies
- standard operating procedures
- public safety
- vehicle and equipment protection
- inventory control
- fraud
- theft
- personal protection

S1127.6 Describe procedures of estimating an installation. (4/3 hrs)

Describe elements of preparing and documenting a job estimate which includes:

- materials
- labour
- tools
- equipment
- permits

Demonstrate the completion of estimation documentation.

LEARNING CONTENT:

S1127.7 Describe procedures for writing up and reporting an installation. (4/3 hrs)

Identify describe elements of project management including:

- material lists
- times sheets
- work schedules
- sub-contractor coordination
- permit acquisition
- equipment scheduling

Identify various project management documents including:

- critical path summary
- master schedules
- deficiency lists

Number: **S1128.0**

Reportable Subject: **CUSTOMER SERVICE AND COMMUNICATIONS**

Duration: Total 12 hours Theory 9 hours Practical 3 hours

Prerequisites: Grade 12

Content:

1128.1 Identify elements and features of effective installation scheduling. **1/0.5 hrs**

1128.2 Describe characteristics of effective customer service practices. **1/0.5 hrs**

1128.3 Describe effective selling and servicing skills. **3.5/1 hrs**

1128.4 Demonstrate use of electronic equipment. **3.5/1 hrs**

Evaluation & Testing:
Assignments related to theory and appropriate application skills
Minimum of one mid-term test during the term
Final exam at end of term
Periodic quizzes

Mark Distribution:

Theory Testing	Practical Application Testing	Module Final Assessment
75%	25%	100%

Instructional and Delivery Strategies:
Lecture
Classroom workshops
Video
Computer Based Training
E-Learning

Reference Material:
ASPI Basic Pool & Spa/Hot Tub Technology 3rd Edition
Aquatic Facility Operator 3rd Edition
Project Management for Builders and Contractors
Various Manufacturers' Manuals

S1128.0 Customer Service Techniques

Duration: Total 12 hours Theory 9 hours Practical 3 hours

Cross Reference to Installer Training Standards:
2.12, 3.12, 4.10, 5.12, 6.12, 7.11, 8.11

GENERAL LEARNING OUTCOME:

Upon successful completion, the apprentice is able to identify and describe techniques for effective customer service.

CURRICULUM OUTCOMES:

S1128.1 Identify elements and features of effective installation scheduling. (1/0.5 hrs)

Describe effects of effective installation scheduling including:
- cost savings
- time saving
- customer satisfaction

Identify factors of installation scheduling including:
- service identification
- prioritization
- geographical location and access
- supplies
- customer requests

Describe an installation schedule.

LEARNING CONTENT:

S1128.2 Describe characteristics of effective customer service practices. (1/0.5 hrs)

Identify elements and characteristics of customer service practices including:

- telephoning procedures
- customer complaints
- personal conduct
- explaining warranties to customers
- collection
- invoicing
- notification
- contact
- response times

S1128.3 Describe effective selling and servicing skills. (3.5/1 hrs)

Identify procedures for developing sales opportunities which include:

- equipment sales and upgrades
- additional services
- chemical replenishment
- accessories and complementary items
- new product introductions
- estimating

Describe use of sales tools including

- brochures
- catalogues
- samples
- quote forms

Describe sales techniques including:

- verbal
- written proposals
- product demonstration

LEARNING CONTENT:

S1128.4 Demonstrate use of electronic equipment. (3.5/1 hrs)

Describe the use of electronic equipment to identify:

- estimates
- product identification
- site evaluations
- customer records
- sales
- installation problems
- scheduling
- invoicing
- tool requirements
- inventory control
- communication accuracy
- technical support
- equipment monitoring
- customer service improvements
- organizing permits
- inspections
- coordinating sub-trades

Number: **S1129.0**

Reportable Subject: **AUTOMATION AND CONTROLS**

Duration: Total 30 hours Theory 24 hours Practical 6 hours

Prerequisites: Grade 12

Content:

S1129.1 Describe functions and application of pool and spa/hot tub automation and controls. **6/1.5 hrs**

S1129.2 Describe functions and operational procedures for chemical controls, readers, and feeders. **6/1.5 hrs**

S1129.3 Describe functions and operational procedures for automatic covers. **6/1.5 hrs**

S1129.4 Describe functions and operational procedures for environmental controls. **6/1.5 hrs**

Evaluation & Testing:
Assignments related to theory and appropriate application skills
Minimum of one mid-term test during the term
Final exam at end of term
Periodic quizzes

Mark Distribution:

Theory Testing	Practical Application Testing	Module Final Assessment
80%	20%	100%

Instructional and Delivery Strategies:
Lecture
Classroom workshops
Video
Computer Based Training
E-Learning

Reference Materials:
ASPI Basic Pool & Spa/Hot Tub Technology 3rd Edition
Aquatic Facility Operator Manual 3rd Edition
ASPI Builders Reference Manual
Various Manufacturers' Manuals

S1129.0 Automation And Controls

Duration: Total 30 hours Theory 24 hours Practical 6 hours

Cross Reference to Installer Training Standards:
3.05, 3.06,3.11,3.12, 3.16; 4.08-4.10; 5.07, 5.13, 5.15-5.17; 6.09

GENERAL LEARNING OUTCOME:

Upon successful completion, the apprentice is able to identify and describe features and applications of pool and spa/hot tub automation and controls.

CURRICULUM OUTCOMES:

S1129.1 Describe functions and application of pool and spa/hot tub automation and controls. (6/1.5 hrs)

Identify functions and application of digital and analog controls including:

- valve controls
- actuators
- timers
- lighting controls
- water temperature controls
- flow control
- metering
- remote controls
  - infra-red
  - radio frequency

Describe functions and application of digital and analog spa-side control panels including:

- operation
- components
- construction

Identify common problems than can occur with mechanical and electronic boards.

Describe procedures for the programming, repair, and maintenance of controls and automation.

LEARNING CONTENT:

S1129.2 Describe functions and operational procedures for chemical controls, readers, and feeders. (6/1.5 hrs)

Describe functions and operation of automated chemical level reading and recording equipment including:

- ORP meters
- pH meters

Describe functions and operation of automated chemical-level regulating and feeding equipment including:

- liquid chlorine feeders
- chlorine generators
- pH adjusters
- ozone generators
- chlorine gas feeders
- erosion feeders

Identify common problems than can occur with chemical-regulating controls including:

- mechanical
- electronic

S1129.3 Describe functions and operational procedures for automatic covers. (6/1.5 hrs)

Describe functions and operation of automatic covers including:

- electric
- hydraulic
- manually driven
- soft
- rigid
- insulating

Describe repair and maintenance of automatic covers.

LEARNING CONTENT:

S1129.4 Describe functions and operational procedures for environmental controls. (6/1.5 hrs)

Describe functions and application of environmental controls including:

- humidity
- air temperatures
- water temperature
- fresh air
- lighting controls

Identify installation and operating procedures for environmental controls.

Number: **S1130.0**

Reportable Subject: **ADVANCED PLUMBING INSTALLATIONS**

Duration: Total 24 hours Theory 21 hours Practical 3 hours

Prerequisites: Grade 12

Content:

S1130.1 Describe functions and applications of water hydraulics. **6/1 hrs**

S1130.2 Describe functions and operations of pool and spa/hot tub water feature combinations. **5/0 hrs**

S1130.3 Describe installation and adjustments of in-floor cleaning systems. **6/1 hrs**

S1130.4 Describe functions and operations of hydrotherapy jets. **6/1 hrs**

S1130.5 Identify governing legislation for the installation and maintenance of gas piping. **1/0 hrs**

Evaluation & Testing:
Assignments related to theory and appropriate application skills
Minimum of one mid-term test during the term
Final exam at end of term
Periodic quizzes

Mark Distribution:

Theory Testing	Practical Application Testing	Module Final Assessment
87%	13%	100%

Instructional and Delivery Strategies:

Lecture
Classroom workshops
Video
Computer Based Training
E-Learning

Reference Materials:

Government Legislation
ASPI Basic Pool & Spa/Hot Tub Technology 3rd Edition
Manufacturers' Technical and Training Manuals
Technical Standards and Safety Authority
ASPI Builders Reference Manual

S1130.0 ADVANCED PLUMBING INSTALLATIONS

Duration: Total 24 hours Theory 21 hours Practical 3 hours

Cross Reference to Installer Training Standards:
3.05, 3.06,3.11,3.16; 4.08, 4.10; 5.06, 5.07, 5.13, 5.16, 5.17; 6.06, 6.09

GENERAL LEARNING OUTCOME:

Upon successful completion, the apprentice is able to identify and describe all elements and features of installing pool and spa/hot tub plumbing systems.

CURRICULUM OUTCOMES:

S1130.1 Describe functions and application of water hydraulics. (6/1 hrs)

Describe principles of water flow including:
- head and friction loss
- pump curves
- suction lift
- pipe sizing
- equipment sizing
- water features
- fountains

Perform calculations for water flow including:
- head and friction losses
- flow rates
- velocity
- equipment sizing
- pipe sizing

Identify pertinent government regulations for the use of water hydraulics including:
- Health & Environmental
- ANSI
- ASME
- NSF

LEARNING CONTENT:

S1130.2 Describe functions and operations of pool and spa/hot tub water feature combinations. (5/0 hrs)

Describe functions of water flow specialty applications including:

- waterslides
- vanishing edges
- water features
- fountains

Identify the components of pool and spa/hot tub water feature combinations including:

- plumbing configurations
- flow control valves

Identify problems that can occur with plumbing components including:

- inadequate flow
- spill
- splashing
- water filtration
- water treatment

S1130.3 Describe installation and adjustments of in-floor cleaning systems. (6/1 hrs)

Describe the operation and function of in-floor cleaning systems and components including:

- control valves
- cleaning heads

Describe installation problems that can occur with in-floor cleaning systems including:

- component replacements
- cleaning heads

LEARNING CONTENT:

S1130.4 Describe functions and operations of hydrotherapy jets. (6/1 hrs)

Identify types of hydrotherapy jets including:

- resistance
- current
- venturi jet

Describe the operation and function of hydrotherapy jets including:

- sizing
- flow rates
- applications

Identify problems than can occur with hydrotherapy jets including:

- operation
- leaking
- winterizing

Describe the assembly and disassembly of hydrotherapy jets.

S1130.5 Identify governing legislation for the installation and maintenance of gas piping. (1/0 hrs)

Identify governing legislation for the handling of gas piping including:

- TSSA
- OHSA
- TQAA
- ACA

Identify procedures for the servicing of gas piping including:

- TSSA licensing requirements
- notifying sub-trades

Number: **S1131.0**

Reportable Subject: **DECKING AND DECK COMPONENTS**

Duration: Total 27 hours Theory 24 hours Practical 3 hours

Prerequisites: Grade 12

Content:

S1131.1 Describe installation procedures for various types of decking. **3/0 hrs**

S1131.2 Describe installation methods for structural reinforcement of concrete decks. **30 hrs**

S1131.3 Describe installation and forming procedures for concrete decks. **3/0 hrs**

S1131.4 Identify features and characteristics of expansion and contraction control. **4/0 hrs**

S1131.5 Describe methods and procedures for preparing the base and supports of concrete decks. **4/0 hrs**

S1131.6 Describe methods and procedures for finishing concrete deck surfaces. **4/0 hrs**

S1131.7 Identify problems than can occur during the installation of a concrete deck. **3/3 hrs**

Evaluation & Testing:

Assignments related to theory and appropriate application skills
Minimum of one mid-term test during the term
Final exam at end of term
Periodic quizzes

Mark Distribution:

Theory Testing	Practical Application Testing	Module Final Assessment
88%	12%	100%

Instructional and Delivery Strategies:
Lecture
Classroom workshops
Video
Computer Based Training
E-Learning

Reference Materials:
ASPI Basic Pool & Spa/Hot Tub Technology 3rd Edition
Manufacturers' Technical and Training Manuals
Municipal and Provincial Building Codes
ASPI Builders Reference Manual

S1131.0 Decking and Deck Components

Duration: Total 27 hours Theory 24 hours Practical 3 hours

Cross Reference to Installer Training Standards:
3.03, 3.06,3.07,3.10; 4.03; 5.03-5.05, 5.09, 5.13, 5.14

GENERAL LEARNING OUTCOME:

Upon successful completion, the apprentice is able to describe installation procedures for decking and deck components.

CURRICULUM OUTCOMES:

S1131.1 Describe installation procedures of various types of decking. (3/0 hrs)

Describe types of concrete decking including:
- impressed patterns
- exposed aggregate
- trowelled and brushed surfaces

Describe installation procedures for stone decking including:
- bricks
- cobblestone
- interlocking stone

Describe installation procedures for natural stone decking including:
- dry flagstone
- mortared flagstone
- random stone
- cut stone
- above grade decks
- grade level decks
- types of wood
- railings

Identify various of types of decking including:
- plastic and metal decking
- railings

LEARNING CONTENT:

S1131.2 Describe installation methods for structural reinforcement of concrete decks. (3/0 hrs)

Describe installation methods for concrete deck structural reinforcement including:

- steel mesh
- reinforcing steel
- polyester and fiber mesh
- chemical additives

S1131.3 Describe installation and forming procedures for concrete decks. (3/0 hrs)

Describe various types of forms used in concrete decking including:

- metal
- plastic
- wood

Describe installation and finishing procedures and methods for various forms used in concrete decking including:

- foam
- cantilever styles
- place forms

S1131.4 Identify features and characteristics of expansion and contraction control. (4/0 hrs)

Describe methods of controlling expansion and contraction for concrete pools including:

- cutting
- special reinforcement
- drainage inserts
- barriers
- material thickness
- spacing
- alignment

LEARNING CONTENT:

S1131.5 Describe methods and procedures for preparing the base and support of concrete decks. (4/0 hrs)

Identify methods of base preparation and installing support for concrete decking including:

- excavation
- material types
- compaction
- sona tubes
- metal supports

Describe features and factors of deck drainage including:

- slopes
- surrounding structures
- yard grading
- material types

Describe methods of base preparation and installing of paving stones including:

- excavation
- material types
- compaction

Describe methods of base preparation and installing of different types of decking including:

- wooden decks
- plastic decking
- metal decking

LEARNING CONTENT:

S1131.6 Describe methods and procedures for finishing concrete deck surfaces. (4/0 hrs)

Identify types of finishing for concrete decking including:
- trowelling
- brushing
- stamping
- exposed aggregate
- colouring
- sealing
- staining

Describe function and application of finishing tools including:
- moulds
- trowels
- floats
- power trowels

Describe methods and techniques of curing and protection of decking including:
- chemical additives
- surface barriers
- moisture application

S1131.7 Identify problems that can occur during the installation of a concrete deck. (3/3 hrs)

Identify problems than can occur with concrete deck including:
- blistering
- holes
- curing
- dusting
- honeycombing
- scaling
- colour
- cracking
- stone popping

Number: **S1132.0**

Reportable Subject: **SPECIALTY APPLICATIONS AND INSTALLATION**

Duration: Total 51 hours Theory 42 hours Practical 9 hours

Prerequisites: Grade 12

Content:

S1132.1 Describe features and characteristics of vanishing edge design and construction. **8/0 hrs**

S1132.2 Describe features and installation procedures for vinyl-lined pool in-wall components. **6/0 hrs**

S1132.3 Describe types and installation techniques of pool and landscaping lighting. **6/2 hrs**

S1132.4 Describe elements of design and installation of special water features. **3/0 hrs**

S1132.5 Describe features and installation procedures of pool cleaning systems. **7/2 hrs**

S1132.6 Identify types and installation procedures for solar heating. **6/2 hrs**

S1132.7 Describe elements and installation techniques of pool design and construction. **4/2 hrs**

S1132.8 Identify environmental techniques of in-door pool design & construction. **2/1 hrs**

LEARNING CONTENT:

S1132.2 Describe features and installation procedures for vinyl-lined pool in-wall components. (6/0 hrs)

Describe vinyl-lined pool in-wall features including:

- in-wall steps
- poolside Spa/Hot Tubs
- benches
- ledges

Describe construction factors and techniques including:

- liner retention
- liner fitting
- feature location
- plumbing considerations
- forming
- finishing

S1132.3 Describe types and installation techniques of pool and landscaping lighting. (6/2 hrs)

Describe types of pool light fixtures and bulb including:

- dry-niche
- wet-niche
- fiber-optic
- halogen
- light emitting diode (LED)
- incandescent

LEARNING CONTENT:

S1132.4 Describe elements of design and installation of special water features. (3/0 hrs)

Identify types of special water features including:
- waterfalls
- fountains
- current pools

Describe methods and procedures for installation of special water features including:
- location
- hydraulic layouts
- controls
- foundations

S1132.5 Describe features and installation procedures of pool cleaning systems. (7/2 hrs)

Describe types of pool cleaning systems including:
- pressure
- suction
- in-floor

Describe installation procedures for pool cleaning systems including:
- fitting locations
- installation methods
- operations
- testing

LEARNING CONTENT:

S1132.6 Identify types and installation procedures for solar heating. (6/2 hrs)

Describe various types of solar heating including:
- glazed panels
- unglazed panels
- roof mounted
- ground level

Describe methods and procedures for installing solar heating including:
- piping
- hydraulics
- roof mounted
- installation methods
- ground level
- safety legislation

S1132.7 Describe elements and installation techniques of pond design. (4/2 hrs)

Describe factors in pond installation including:
- liner types
- non-liner types
- filtration
- bio-filters
- plumbing considerations
- plants
- wildlife

S1132.8 Identify environmental features and techniques of in-door pool design and construction. (2/1 hrs)

Identify factors and elements of environmental controls including:
- de-humidification
- heating
- ventilation

Glossary of Terms

ANSI	American National Standards Institute
ASME	American Society of Mechanical Engineers
CAC	Curriculum Advisory Committee
CEC	Canadian Electrical Code
CSA	Canadian Standards Association
ESA	Electrical Safety Authority (Ontario)
NSF	National Sanitation Foundation
ASPI	National Spa & Pool Institute
OBC	Ontario Building Code
OHSA	Occupational Health and Safety Act
TDG	Transportation of Dangerous Goods
TSSA	Technical Standards and Safety Authority
WHMIS	Workplace Hazardous Materials Information System
WSIB	Workplace Safety and Insurance Board